

WHAT IS CLAIMED IS:

1. A PLL frequency synthesizer, comprising:

a voltage-controlled oscillator for outputting an output

5 frequency signal corresponding to a control voltage signal;

a phase comparator for outputting an output signal corresponding to a phase comparison between the output frequency signal and a reference frequency signal; and

a charge pump circuit for varying the control voltage signal

10 according to the phase-compared signal;

whereby a feedback loop is configured,

wherein signal flow of the feedback loop is periodically varied in a phase comparison cycle used in the phase comparator.

15 2. The PLL frequency synthesizer according to claim 1, wherein the operation of the feedback loop periodically stops in the phase comparison cycle used in the phase comparator.

20 3. The PLL frequency synthesizer according to claim 2, wherein the feedback loop includes a loop opening/closing switch circuit therewithin.

25 4. The PLL frequency synthesizer according to claim 3, wherein a first filter circuit and a second filter circuit for determining the signal flow of the feedback loop are provided in a path which extends from the charge pump circuit to the voltage-controlled oscillator, and

the loop opening/closing switch circuit is provided between the first filter circuit and the second filter circuit.

5. The PLL frequency synthesizer according to claim 3, wherein  
the loop opening/closing switch circuit includes an MOS transistor.

6. The PLL frequency synthesizer according to claim 3, wherein  
5 the loop opening/closing switch circuit includes a JFET transistor.

7. The PLL frequency synthesizer according to claim 2, wherein  
the feedback loop stops the output of an output signal from the charge  
pump circuit.

10 8. The PLL frequency synthesizer according to claim 7, wherein  
the charge pump circuit includes a path opening/closing switch circuit  
in an output path for an output signal outputted from the charge pump  
circuit.

15 9. The PLL frequency synthesizer according to claim 8, wherein  
the path opening/closing switch circuit includes an MOS transistor.

20 10. The PLL frequency synthesizer according to claim 8, wherein  
the path opening/closing switch circuit includes a JFET transistor.

25 11. The PLL frequency synthesizer according to claim 1, wherein  
at least one filter circuit for determining the signal flow of the  
feedback loop is provided in a path which extends from the charge  
pump circuit to the voltage-controlled oscillator, and  
the filtering characteristic of the filter circuit is  
periodically varied in the phase comparison cycle of the phase  
comparator.

30 12. The PLL frequency synthesizer according to claim 11, wherein

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the filter circuit includes,  
a bypass path group having at least two bypass paths different  
in filter characteristic, and  
a selector switch circuit which selects a predetermined bypass  
5 path from the bypass path group.

13. The PLL frequency synthesizer according to claim 12, wherein  
the bypass path group includes,

at least two filter constituent elements connected in parallel,

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the selector switch circuit which selectively switch at least  
one of the filter constituent elements as a constituent part of the  
predetermined bypass path.

145 14. The PLL frequency synthesizer according to claim 12, wherein  
the bypass path group includes,

at least two filter constituent elements connected in series,

and

20 the selector switch circuit which selects at least one of the  
filter constituent elements by short-circuiting.

15. The PLL frequency synthesizer according to claim 12, wherein  
the selector switch circuit includes a MOS transistor.

25 16. The PLL frequency synthesizer according to claim 12, wherein  
the selector switch circuit includes a JFET transistor.

17. The PLL frequency synthesizer according to claim 11, wherein  
the filter circuit includes a variable filter constituent element  
30 for varying the filtering characteristic thereof.

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18. The PLL frequency synthesizer according to claim 17, wherein  
the variable filter constituent element is an active resistive  
elemental device.

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19. The PLL frequency synthesizer according to claim 18, wherein  
the active resistive elemental device is a MOS transistor.

10 20. The PLL frequency synthesizer according to claim 18, wherein  
the active resistive elemental device is a JFET transistor.

15 21. The PLL frequency synthesizer according to claim 1, wherein  
the charge pump circuit includes an output capability switching circuit  
for selecting the capability of supply of an output signal outputted  
from the charge pump circuit.

20 22. The PLL frequency synthesizer according to claim 21, wherein  
the output capability switching circuit selects a drive power source  
voltage for an output-stage circuit of the charge pump circuit.

25 23. The PLL frequency synthesizer according to claim 21, wherein  
the output capability switching circuit selects a drive current for  
an output-stage circuit of the charge pump circuit.

25 24. The PLL frequency synthesizer according to claim 21, wherein  
the output capability switching circuit selects an output transistor  
size for an output-stage circuit of the charge pump circuit.

30 25. The PLL frequency synthesizer according to claim 1, wherein  
a period in which the characteristic variation or the operation stop

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is performed, is a predetermined period which includes an output period of the reference frequency signal subjected to comparison in the phase comparator.

5        26. The PLL frequency synthesizer according to claim 25, further including a frequency divider for frequency-dividing the reference frequency signal, and

wherein a frequency signal compared in the phase comparator is a divided frequency signal outputted from the frequency divider.

10        27. The PLL frequency synthesizer according to claim 4, wherein the filter circuit is either a voltage-driven type or a current-driven type.

15        28. The PLL frequency synthesizer according to claim 11, wherein the filter circuit is either a voltage-driven type or a current-driven type.

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